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(54) Title: METHOD FOR THE SPATIALLY RESOLVED DETERMINATION OF PHYSICAL, CHEMICAL AND/OR BIOLOGICAL PROPERTIES OR STATE VARIABLES

(57) Abstract: Method for the spatially resolved determination of physical, chemical and/or biological properties or state variables and/or the change therein in an examination area of an examination object by determining the change in the spatial distribution and/or the mobility, of magnetic particles as a function of the effect of physical, chemical and/or biological influencing variables on at least a part-area by means of the following steps: a) introducing covered and/or coated magnetic particles with at least one solid, viscous and/or liquid shell or coating into at least part of the examination area b) generating a magnetic field with a first part-area having a low magnetic field strength and a second part-area having a higher magnetic field strength, c) changing the, spatial position of the two part-areas in the examination area or changing the magnetic field strength in the first part-area so that the magnetization of the particles is locally changed, d) detecting signals that depend on the magnetization in the examination area that is influenced by this change, and e) evaluating the signals so as to obtain information about the change in the spatial distribution and/or mobility of the magnetic particles in the examination area. The invention also relates to functionalised magnetic particle compositions and magnetic particle compositions suitable for use in the above method. The invention further also relates to an apparatus for the measurement of state variables in the examination area.

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/2004/050447

A¹ CLASSIFICATION OF SUBJECT MATTER
 IPC 7 A61B5/06 A61K49/18

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B A61K G01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 095 124 A (BRUKER MEDIZINTECH) 30 November 1983 (1983-11-30) cited in the application claims 1-3	35
A	US 4 136 683 A (GORDON ROBERT T) 30 January 1979 (1979-01-30) the whole document	35
A	US 6 082 366 A (ANDRAE WILFRIED ET AL) 4 July 2000 (2000-07-04) column 4, line 48 - column 5, line 55	35
P,A	EP 1 304 542 A (PHILIPS CORP INTELLECTUAL PTY ; KONINKL PHILIPS ELECTRONICS NV (NL)) 23 April 2003 (2003-04-23) paragraphs [0030] - [0040], [0050] - [0054]	35

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

8 September 2004

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INTERNATIONAL SEARCH REPORT

International application No.
CT/IB2004/050447

Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1-19
because they relate to subject matter not required to be searched by this Authority, namely:
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:
1-19, 35

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-19, 35

A method and an apparatus for the spatially resolved determination of physical, chemical and/or biological properties or state variables and/or their change in an examination area comprising the step of and means for, respectively, generating magnetic fields, changing its spatial position, detecting and evaluating signals.

2. claims: 20-32

Functionalised magnetic particle composition comprising magnetic particles coated with a functional coating material that changes physico-chemical properties.

3. claims: 33, 34

Magnetic particle composition having a particular magnetization curve.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 1-19

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PC/PCT/IB2004/050447

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